

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A protective relay for an induction motor, having known operating parameters including known overload thermal current limits, comprising:

a circuit for measuring the input current to the motor;

a first program function for establishing a first thermal threshold value for a start condition of the motor;

means for determining a representation of the thermal condition of the motor during the start condition thereof;

~~A comparing element~~ a comparator for comparing the start condition thermal representation with said first thermal threshold value and for producing an output signal when said first thermal threshold value is exceeded by said start condition thermal representation;

a circuit for establishing a second thermal threshold value for a run condition of the motor, the second thermal threshold value being different from the first thermal threshold value, wherein the circuit for establishing a second thermal threshold value includes and including a selected time constant which is used to calculate results in a time-current curve[[s of]] combining the start and run time-current curves ~~conditions being resulting in a~~ substantially continuous time-current curve;

means for determining a representation of the thermal condition of the motor during the run condition thereof; and

a comparator for comparing the run condition thermal representation with said second thermal threshold value and for producing an output signal when said second thermal threshold is exceeded by said run condition thermal representation.

2. (Currently Amended) A system of claim 1, wherein the protective relay allows the user to set the time constant ~~can be set by an operator, the time constant provided by the manufacturer,~~ for a particular motor.

3. (Currently Amended) A system of claim 1, wherein the time constant is calculated using the equation:

$$TDR \left[\frac{R_1}{R_0} \cdot I_L^2 (T_a - T_o) \right]$$

where

$$TDR = \frac{1}{\frac{R_1}{R} \cdot 6.25} \cdot \frac{T_a}{T_a - T_o} \cdot \frac{TD}{\ln \left[\frac{6.25}{6.25 \cdot (SF)^2} \right]}$$

and

R1 = locked rotor electrical resistance

R0 = running rotor electrical resistance

IL = locked rotor current

Ta = locked rotor time with motor initially at constant temperature

To = locked rotor time with motor initially at operating temperature

TD = the time needed to reach trip temperature

SF = service factor (threshold temperature)